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SCIENCE NEWS LETTER

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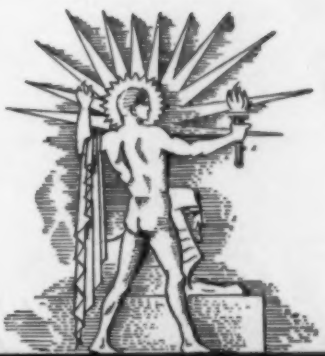
THE WEEKLY SUMMARY OF CURRENT SCIENCE •



AUGUST 29, 1936

Fire!

See Page 132

A SCIENCE SERVICE PUBLICATION

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Edited by WATSON DAVIS

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DO YOU KNOW?

Blindness caused by wood alcohol is permanent and cannot be cured.

Green colored vinegar is now being made from grapefruit as a citrus by-product.

In all China there are less than 48,000 motor vehicles, and most of these came from America.

Sugar beets growing in fields and held in storage are liable to attack by a large number of fungi, over 50 of which belong to a single genus.

Experiments in using duck eggs in place of hen eggs in cake and other recipes have been made at Cornell University.

A Hungarian has found that spoilage of milk and other dairy products can be delayed by inoculating them with a weak bacterial flora.

Road construction in Babylon in Nebuchadnezzar's time is described on a brick found in the city, which mentions streets "made strong within with bitumen and burnt brick as a high-lying road."

German farmers are being urged by the government to raise sheep to increase the country's wool supply.

The proposed French-Italian road tunnel under Mont Blanc is expected to require six years of construction work.

Air conditioning in the Senate is adjusted somewhat warmer than in the House of Representatives, to suit the more elderly group of Senators.

As many as 189 species of American mammals are denounced as vermin, but among these "varmints" that worry farmers or other citizens 116 kinds are fur bearers of economic value.

It is reported from Germany that road tests show certain artificial rubber tires are capable of giving double the road performance of tires made from natural rubber.

Soviet scientists have established "frostology" stations in regions where freezing of the earth is a problem, to study effects of freezing and thawing on building construction and other activities.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ARCHAEOLOGY

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SEISMOLOGY

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ZOOLOGY

Is the python as terrible in fact as in legend? p. 142.

Where are Okapi still found? p. 136.

ASTRONOMY

Milky Way Still in Infancy Judging By Mass Radiated

French Astronomer, Agreeing With Expanding Universe Theory, Finds Stars in Brief Time Have Lost Little

NEW scientific evidence that the universe is expanding, and a stilling of the fears of those people who worry because the sun and the stars are "quickly" destroying themselves by turning their mass into the radiation they emit, is presented in the *Astrophysical Journal.* (September).

M. Henri Mineur, astronomer at the Observatory of Paris, reports calculations showing that the stars of the Milky Way, despite their age of tens of thousands of millions of years, have only radiated away about one hundredth of their mass.

Thus if one takes M. Mineur's estimate that Milky Way stars are from ten to twenty billion years old, the apparent age of the universe, before all the mass is radiated away, would be about a trillion years. Compared to the life of a man who lives to be 75 years old the star galaxy which contains the earth and the Milky Way is only a baby, about nine months old, and cutting its first teeth.

Significant to astronomers is M. Mineur's calculations showing that the stars in the Milky Way must have been formed in the beginning with almost the same mass which they have today. Present-held theories of star evolution, therefore, must go by the board if the French astronomer's calculations and the observations on which they are based are correct.

Very Little Lost

Says the French astronomer:

"The upper limit we have found for the age of the stars is so small that, in so brief a time, the great majority of the stars cannot have lost more than a hundredth part of their mass. We must therefore believe that the stars were formed with nearly the same masses as they have now, and that the differences in temperature and spectral type actually observed are due to the fact that the stellar masses were already different at the time of their formation.

"An evolution of the stars such as has been generally accepted is, then, impossible. Our result is, however, in perfect agreement with the theory of the expansion of the universe. G. Lemaitre has suggested a hypothesis for the formation of the extragalactic nebulae based upon his theory of the expansion of the universe, according to which the age of the Milky Way would not exceed ten thousand million years."

The G. Lemaitre referred to is the well-known Abbe Lemaitre, Belgian astronomer who has frequently visited America and has been attached to the faculty of Massachusetts Institute of Technology and also on the staff at Mt. Wilson Observatory.

Abbe Lemaitre's hypothesis on the expansion of the universe is now generally accepted among astronomers. It postulates that at some distant time in the past there was a gigantic explosion which sent the component parts of the universe into an expansion which is still going on. The various stars and galaxies are rushing away from one another with velocities as high as 15,000 miles per second.

Experimental verification of this "rushing-apartness" of the universe comes from observations on the reddening of the light from distant stars and nebulae. This red shift, or lengthening of the wave-lengths of the light from the distant stars, is the optical equivalent of the case in sound where the pitch of a railroad train's whistle becomes lower, or deeper in tone, as the train passes an observer.

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MEDICINE

Hay Fever Patients Aided By Motion Picture Film

A MOTION picture entitled "Hay Fever" has been prepared at the Mayo Clinic as an aid to hay fever patients. The film, Dr. L. E. Prickman explained at a recent staff meeting, is intended to teach the patient "all the little details by which he can lessen the severity of his symptoms" and thus improve the results of desensitization treatment—details which the busy practitioner cannot always find time to discuss with every patient.

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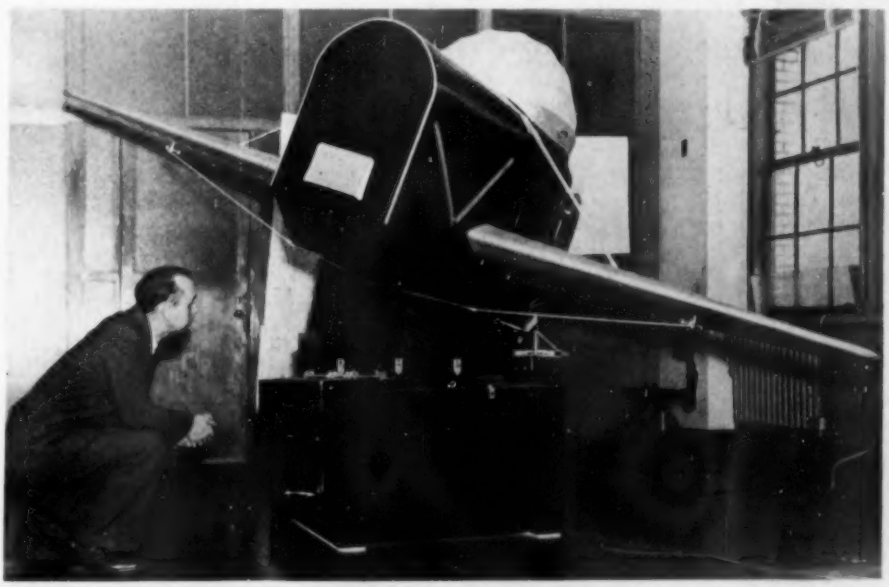

FOR TRAINING

Hooded and stubby is the blind flying training plane in use at the Bureau of Air Commerce in Washington. Within its covered cockpit the pilot "flies" a course from maps, radio beam signals and his instruments by moving the plane's controls. The fixed plane will turn in almost any direction comparable to real flight except spin. Across the room the "flight" is automatically recorded on a sheet of large tracing paper so that the student pilot can later check his errors. The training instructor communicates with the pilot by earphones and at intervals gives "weather reports."

CONSERVATION

Modern Science Helps To Combat Forest Fire Menace

Airplane and Radio Contribute in Attempt to Spot Blazes and Quench Them Before the Losses Mount

See Front Cover

ABNORMALLY high temperatures and dry periods which have lasted months instead of weeks are responsible for the roaring and crackling forest fires sweeping the Northwest. In no sense has there been any let down in the vitally important efforts of the U. S. Forest Service to decrease the annual $50,000,000 loss from forest fires.

On the contrary new methods of training forest rangers, new techniques in fire fighting in the woods and improved detecting methods are more in use than ever. In a year with normal precipitation and temperatures the fire toll in the forests during 1936 might well be less than ever before. What has happened is that the forest fire "season" of September and October has been moved forward a whole month by the severe drought conditions. Sections normally damp and moist at this time of the year are now timber-dry and have been for weeks. Despite all precautions fires now wage through wide areas and the total loss may well exceed the $60,000,000 damage in the northwestern 1918 holocaust.

Use Airplanes and Radios

The most apparent change in modern forest fire fighting methods lies in the use of the airplane and the radio as detecting and communicating devices. Twelve hundred shortwave radio sets were in use in 1935 in the National Forests alone, as only one example. Aerial photographs are now quickly taken high over the forest fires and speeded to "headquarters" where forest rangers and fire marshals can map their best plan of attack.

As anyone at the firehouse nearest your own home will tell you, the best way to stop fires is to prevent them. And the next best thing is to discover them with all possible speed. The same rule applies to the much larger forest fires with added emphasis. Getting the jump on a forest fire is quite like the swift get-away needed in a 100-yard dash. The first brief interval of time counts most.

Right now throughout Montana and Idaho visibility meters are being installed in lookout stations which tell the forest rangers the distance at which a small smoke should be detected, under the atmospheric conditions existing.

See Fire 10 Miles Away

On good seeing days a fire lookout, with his trained sight, can detect a tiny pinpoint of smoke from an embryo fire at a distance of ten miles. On other days similar smoke only five miles away may escape detection. Low visibility means added fire menace and that extra lookouts should be assigned to the station to spot the fires while they are still small enough to control. The visibility meter gives a quick index of the danger from poor seeing conditions. It will be a mechanical means of getting the jump on an incipient fire.

Aid from the airplane in fighting the menace of forest fires is progressing beyond mere detection alone. Roy Headley, chief of the Division of Fire Control of the Department of Agriculture, has announced that a new program of fire combat from the air is being tested on an experimental basis. The hope is that by dropping water or chemicals directly on small fires their spread will be retarded until the ground crews can reach them.

Fire retardent chemicals and even small explosive bombs are also on the program. By carefully aiming and "planting" bombs around a small fire, it might be possible partially to smother it with dirt or even throw up a narrow trench of earth which, for a time, would stop the spread of the flames. The method again illustrates the need for quick action to prevent the forest fire "infant" from becoming a gigantic uncontrollable demon.

The present use of the airplane to transport supplies and equipment quickly has already demonstrated its success. In some cases the planes merely fly over the working parties on the ground and drop the supplies in specially wrapped packages.

Special Eyesight Tests

Training fire lookouts is a special task in itself wherein unusual types of eyesight testing are now employed. Particularly desired is the man whose eyes

SPOTTING THE BLAZE

The lookout in a National Forest station is sighting at a new blaze with the alidade, an instrument which enables him to locate it accurately.

OFF TO THE BATTLE

Pack on his back, a smokechaser leaves a two-man lookout station in Idaho. The photographs here, on the facing page and on the front cover are official photographs of the U. S. Forest Service.

can spot a tiny fleck of gray on a background of green or reddish brown. Smoke and the summer and autumn foliage of the forests are the three shades, of course.

The success of the government's forest fire protection in past years is best told by figures showing acres burned.

In 1935 there were about 10,000 forest fires started in the National Forests from one cause or another. That figure is high compared with the 8,000 a year average for years from 1931 to 1934. But note this fact: in 1935 only 178,133 acres of national forests were burned over, compared with 440,802 acres average for the four preceding years.

Even more significant is the fact that in 1935 there were only 156 "extra-period" fires compared with an average of 270 yearly from 1931 to 1934. An "extra-period" fire, it might be explained, is one which is still out of control after 10 a. m. of the day following its discovery.

Cause of Fires

How do forest fires start? Man, mainly, is responsible either through carelessness with campfires, matches and pipes and cigarettes or in some cases by deliberate arson. Lightning is the next largest cause.

The Forest Service is at the point today where it is only the so-called "freak" fire that outwits the fire-fighters. Out of the thousands of forest fires each year only about a score cause real trouble.

It now takes a combination of extra-dry weather over a sizable period of time, a rugged inaccessible terrain and conditions favorable for exceptionally rapid spreading to bring about a "freak."

Forest fire protection costs money, it is true, but the significant fact is that about 90 per cent of all the nation's forest fire losses now occur on lands without organized protection.

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MEDICINE

Truants From Medicine Found Fame Elsewhere

THE GIFTS of medicine to humanity —conquests of diseases, relief of suffering and prolongation of life—have never been minimized. Yet from early times there have been medical men who, turning aside from their profession, have made outstanding contributions in other than medical fields.

A roster of these medical "truants" was called by Lord Moynihan of Leeds in the latest Linacre Lecture at Cambridge University, given in memory of one of the earliest and most distinguished of the truants from medicine. In this lecture, now available in book form (Truants; Cambridge University Press), Lord Moynihan refers to some hundred men, trained as physicians, who won distinction as writers, artists, scientists, statesmen, explorers, actors and even athletes.

Among the latter Lord Moynihan lists the great cricketer, W. G. Grace; Lennard Stokes, outstanding Rugby player; and the lawn tennis player, Joshua Pim, who won four championships.

Most persons will recall that Clemenceau deserted medical practice for politics; that Keats and Goldsmith studied medicine; that Oliver Wendell Holmes carried on simultaneously in medicine and literature, winning fame not only as the author of the Breakfast Table series but also as the first person to point out that puerperal or childbed fever is contagious.

The name of Sir Francis Seymour Haden is well known in the art world but perhaps less well known is the fact that this eminent etcher carried on a large and important medical practice, often making professional rounds with an etching plate in his pocket.

"Sherlock Holmes" owed his methods of solving a mystery to the fact that his creator, Conan Doyle, studied medicine under Joseph Bell, a Scottish surgeon who impressed on all his pupils the "endless significance of trifles and of small distinctions."

John Bull

The name of John Arbuthnot, physician and wit of the early 18th century, may not be familiar to many 20th century readers, but who does not know John Bull? This famous character and name was probably created when Arbuthnot published *Law in a Bottomless Pit, or the History of John Bull,* Lord Moynihan states.

A physician of the 16th century, William Gilbert, gave the word electricity to the English language, while important additions to knowledge of electricity were made by an Italian physician, Galvani. Copernicus, the founder of modern astronomy, Linnaeus, father of modern scientific botany, Galileo, Robert Boyle—all held medical degrees and are ranked with the other "truants" by Lord Moynihan.

Honor of being the first truant goes to Imhotep, the Egyptian physician of nearly six thousand years ago, who combined with his duties of physician those of being the Pharaoh's chief Lector, Priest, Architect, and Grand Vizier.

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PHYSICS

New Kind of Atom Destruction Found in Pike's Peak Tests

COSMIC RAYS, already one of the most baffling mysteries of the world of science, are even more complex in their behavior than hitherto imagined. New ways, heretofore unreported, in which the penetrating rays can destroy atom nuclei by impact have been discovered by Drs. Carl D. Anderson and Seth H. Neddermeyer of California Institute of Technology. Dr. Anderson is well known for his discovery of the famous "positron", one of the fundamental particles from which all matter appears to be composed.

In a report to the American Physical Society (*Physical Review*, Aug. 15) the California scientists make the first full disclosure of their recent high altitude experiments atop Pike's Peak, Colorado.

The California scientists discovered:

1. That the bundles of cosmic ray energy, known as photons, can disintegrate heavy atoms such as lead.

2. That light and tiny electrons can smash into the nuclear heart of atoms and occasionally break them up and make them eject massive particles.

3. That some of the disintegrations seem to be produced by the non-charged and piercing particles known as neutrons occurring as secondary radiation in the cosmic rays.

In the experiments tons of apparatus were moved from Pasadena by truck across deserts and up Pike's Peak in order that the identical equipment could be used at the two locations to give a most accurate comparison of results.

In an intensive program of research on the mountain top Dr. Anderson and Dr. Neddermeyer accomplished what was virtually a whole year of investigation in a few weeks. Thousands of photographs were taken with Wilson cloud chamber apparatus which showed cosmic rays destroying atoms and molecules. Use of the mountain top was prompted by the knowledge that much of the earth's atmosphere would be below the instruments so that the cosmic rays observed would be more powerful than in the Pasadena laboratory near sea level.

While other investigators have taken measurements of cosmic rays at even greater heights, the Anderson-Neddermeyer research was the first in which actual photographs of the atomic breakdowns were obtained.

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CLIMATOLOGY

Hawaii's Climate Changes With Shift in Trade Wind

WHILE weather on the "Mainland" is giving people plenty to think about, students of climatology in Hawaii are having their own problems to puzzle over. Three changes have become apparent:

Tradewinds in the Pacific have shifted their course.

Hawaii's temperature is gradually rising.

Distribution of rainfall in the mid-Pacific American territory is changing.

Some points in Hawaii are receiving 30 per cent more rain than they did 30 years ago while other points are receiving 21 per cent less. Every month in the year is slightly warmer than the corresponding period 30 years past.

These are some of the conclusions John H. Voorhees, in charge of the U.S. Weather Bureau at Honolulu, has drawn from a study of records covering the period since the Federal Government established an official weather bureau there in 1904.

The warmest December day in Honolulu in nearly half a century was Dec. 8, 1935, when the maximum temperature was 84.6 degrees. The next highest temperature for that month in the past 46 years was Dec. 11, 1926, at 84.1 degrees. These high year-end figures are deceiving in relation to those during July and August, since the temperature change between July and December is but five or six degrees. Because December finds the thermometer standing at 84 degrees does not mean in Hawaii that during the summer months it will climb higher. Trade winds help to maintain a fairly stationary temperature the year around, the mean being about 75 degrees.

First public knowledge of an apparent slight upward climb in Hawaii's temperature was obtained in 1925, when Edward A. Beals, at that time in charge of the U. S. Weather Bureau in Hawaii, reported to his department head in Washington that "Hawaii is growing warmer year by year."

In his report, Mr. Beals stated that seasonal high pressure that before 1925 had prevailed several hundred miles off California, slightly west of San Francisco, had shifted its position and was, in the final analysis, responsible for the rise in temperature in Hawaii.

Observer Beals' records indicated that the temperature in Hawaii had increased nearly a degree in 20 years.

These findings of ten years ago are borne out by a continuance of the study under direction of Mr. Voorhees, who believes the shift in the direction of the trade winds to be responsible.

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MEDICINE

Effect of Nursing On Breast Cancer Reported

A POSSIBLE effect of nursing on the development of breast cancer in mice is reported by Dr. John J. Bittner, of the Jackson Memorial Laboratory at Bar Harbor, Me. (Science, Aug. 14).

The effect is not on the mother but on the offspring. It indicates that the transmission of cancer from one generation of mice in a cancer family to another is not due to straight inheritance but to influences outside the heredity-bearing chromosomes. The cancer-producing factor, it appears from the report, is lapped up at the breast of a mother who carries it.

In Dr. Bittner's investigations, infant mice, less than 24 hours old, from a family line in which breast cancer occurred very frequently were nursed by foster-mothers from a line in which this type of cancer rarely occurred. The percentage of breast cancers occurring in the fostered mice was appreciably less than that for the ancestors of these mice.

Experiments will have to be made

with many more mice to confirm these results. Dr. Bittner reports such experiments have already been started and indicate similar results.

Previous investigations establishing the existence of genetic influences outside the chromosomes in the causation of breast cancer in mice have already been reported by Dr. Clarence Cook Little of the Jackson Memorial Laboratory.

The work described in Dr. Bittner's preliminary report was all done with mice. No mention of human cancer was made and no relation should be drawn between these experiments and problems of cancer prevention in man.

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GENETICS

New Knowledge of Heredity From Study of Primrose

Two New Strains Developed by Dr. Shull Show Characteristics Not Found Even Among Wild Relatives

USING primroses as his laboratory "guinea pigs" for experiments on evolution, Dr. George H. Shull, professor of botany and genetics at Princeton University, has advanced two steps further in his study of the mechanics of heredity with the location and separation of two new strains of Lamarck's evening primrose.

One variety of the species, known as acuminata because of its long pointed leaves, first appeared just recently in the experimental field of forty thousand plants. The other strain, called pollicata after the solid stem it grows between the ovary and style, appeared in 1932 and 1935, but was not proved to be a separate and distinct strain until this summer.

The new plant is striking in that its long leaves almost completely lack the usual crinkledness of the primrose. Its characteristics are recessive, as is demonstrated by the fact that the acuminata appeared in only six out of 25 plants, indicating a one to four ratio for these characteristics in the offspring of the hybrids.

The pollicata first appeared for Dr. Shull in 1932 when it occurred as a gene mutation in pure bred material of Lamarck's evening primrose. Last year it appeared anew in another strain of this species, independent of its previous origin in 1932.

New Strain

This indicated that the pollicata might be a latent characteristic of all primroses, rather than a new development, so Dr. Shull crossed this plant with all 25 different strains of his evening primrose.

The pollicata has now reappeared only in the offspring of the family in which it appeared last summer. None of the crosses with the other plants produced this solid-stemmed flower with "clubby" stigmas, proving that this is now another new strain of the primrose.

It is entirely possible, Dr. Shull explained, that the pollicata might be developed independently in any other experimental work in primroses, but to date this is the only example of this solid-stemmed variety, which is not even found among the wild relatives of the primrose.

The dry weather of the past few weeks has stunted the size of Dr. Shull's plants, but has not hindered the effectiveness of the bloom. The total number of plants growing this year is nearly three thousand larger than the number Dr. Shull has been able to handle any one year at a time since he began this experimental work in 1905.

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PHYSIOLOGY

Woman Without Mystery On Display in New York

"THE WOMAN without a mystery"—a transparent, life-size anatomical model showing every organ, veins, arteries, nerves and skeleton in a woman's body—is on display at the New York Museum of Science and Industry.

Following the private showing before a distinguished group of physicians and scientists, the counterpart of the now famous "transparent man" will go on a two-year tour of 100 cities of the nation. A doctor-lecturer will introduce the figure to scientists, public health officers and the medical profession nationally.

NO SECRETS

The model, which took two years to construct in the Dresden, Germany, Hygiene Museum, is the property of S. H. Camp, philanthropist of Jackson, Mich. It is the only one of its kind in existence.

Cellhorn "Skin"

Outer covering of the transparent woman is a tough, clear material known as cellhorn, made by a secret process only in the German museum which built the intricate model. Cellhorn is a synthetic material which is non-inflammable and almost unbreakable.

Viewing the figure is a weird sensation akin to having something like X-ray eyes. Embedded in the outer transparent covering one sees the veins and arteries interlacing through the body. The nerves spread from the brain and spinal column to their tiny ramifications at the body extremities. Deep inside the figure the skeletal structure is visible, partially covered in places by the various organs of the body proportioned and located as in real life.

Through an ingenious lighting system each organ of the body is illuminated in turn until the whole body stands forth in natural color. As each organ is illuminated its name appears on glass labels around the base.

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Some fish can "sing" by rubbing together the pectoral fin-rays.

ASTRONOMY

Astronomer Observes Meteor Showers

SUCCESSFUL observation of the Perseid meteors on the nights of Aug. 11-12 and Aug. 12-13 was reported by Prof. C. P. Olivier of the Flower Observatory of the University of Pennsylvania to Science Service.

Prof. Olivier, observing at Shadwell, Va., reports that cloudiness and moonlight on the first night of the Perseid shower made the meteor watch difficult. Forty-seven meteors were seen, however. Thirty-four of these were in the Perseid group.

The next night observing conditions were much better and a total of 72 meteor streaks was seen. Fifty of these were Perseid in origin.

One especially fine sporadic meteor, reports Prof. Olivier, crossed nearly half the sky, disappearing and reappearing as it neared the end of its path.

One brilliant Perseid meteor left a flaming train which lasted 10 seconds. Other bright Perseids, mostly red in color, left sparks as well as trains. The average Perseid meteor was yellow in color, as usual, and nearly all had trains of brief duration.

Since Prof. Olivier was observing far away from Flower Observatory, which is the national headquarters of the American Meteor Society, he has not yet received reports from other observers throughout the country and thus cannot give an account, at the present time, of the Perseid shower's richness.

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BIOLOGY

Pure Protoplasm Grown On Oat-and-Water Diet

PROTOPLASM, the material basis of life, is grown in quantity for experimental purposes in the laboratory of Dr. William G. Camp of Teachers College, Columbia University. He feeds it on a simple diet of oatmeal and water.

Dr. Camp's material consists of myxomycetes or slime-molds, very lowly organisms on the dividing-line between plant and animal life, whose bodies consist of naked masses of practically pure protoplasm. They flow around on moist decaying logs in the woods and in other damp places.

Slime-molds have been cultivated by other scientists on shallow dishes filled with agar-jelly containing oatmeal, but in Dr. Camp's new technique the troublesome agar is done away with, making the protoplasmic mass much easier to gather.

He simply folds gauze or filter-paper over one of the shallow dishes, leaving it empty. Then he sets the dish in a wide-mouthed jar containing a little water. The water soaks out into the gauze or paper, making the kind of a place where slime-molds like to grow.

On the wet gauze he "plants" a few bits of inactive slime-mold material, which presently begins growing and creeping about. Then he sprinkles oatmeal directly on it, and covers the little dish up with a glass lid.

The creeping protoplasmic substance engulfs the oatmeal and digests it. As fast as it will "eat," Dr. Camp gives it more oatmeal, until at last he has it in thick sheets, covering the whole gauze layer and creeping up on the sides of the glass jar. It is then an easy matter to scrape it off with a thin-bladed spatula or other suitable instrument.

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ZOOLOGY

Okapi, "Rarest" Animal, Perhaps Not Very Rare

OKAPI, the giraffe's even weirder jungle cousin, may not be so rare or so near extinction as has usually been believed.

So states Attilio Gatti, an experienced African naturalist, who has spent much time in the Congo, where these strange animals dwell. Despite the strict protective laws promulgated by the Belgian government for the okapi's protection, the black pigmy inhabitants of the jungle still capture them in nets and pitfalls and kill them with spears. M. Gatti declares that last year over 100 okapi were thus killed by the little blacks, who have no end of things made of okapi skins in their villages.

M. Gatti proposes two possible ways out of the difficulty: First, he would have okapi sanctuaries created in certain extensive forest areas which the pigmies never enter because of their dread of spirits supposed to be on guard there. Wild animals seem to find out very soon where they will be safe from molestation, and to congregate in such places. Second, M. Gatti would have the Belgian authorities buy uninjured okapi captured by the pigmies and turn them loose in suitable protected parks. The natives, he declares, will be very ready to exchange the animals for white men's prized trade goods.

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IN SCIENCE

ARCHAEOLOGY

First Evidence for Goth Migration Is Found

A WEAPON depot of the Goths has been discovered on the Danube River near Vienna which is one of the first tangible traces of the famous Goth migration through Europe that, hitherto, has been known mainly from historical writings.

Particular interest is due to a two-edged iron sword about three feet in length, with amber pommel, the wooden handle covered with silver leaf and the sheath adorned with a transversely grooved silver band. This is the typically Gothic form of a sword which was imported to western Europe from the Pontus district by the Goths and which became especially popular with the Alemannic tribes in Wurttemberg. Hitherto no sample of this sword form was known in the intermediate territory between Pontus and southern Germany. Only one important find made in a tomb near Komorn in Czechoslovakia had preceded, the interpretation of which, however, was controversial.

Science News Letter, August 29, 1936

CLIMATOLOGY

This Summer Near Bottom Of 46-Year Rainfall Cycle

BY MEASURING the water levels in the Great Lakes for the last century, scientists have now discovered that the great farming and grazing area in the North Central United States is near the bottom depth of what appears to be a 46-year snow and rainfall cycle that is associated with the variations in the radiation coming from the sun.

Dr. Charles G. Abbot, secretary of the Smithsonian Institution, and expert on the solar cycles of radiation, states that the droughts of 1934 and 1936 constitute striking evidence for the now-celebrated 23-year weather cycle which he first announced three years ago. The drainage areas of the North Central section have the local peculiarity of having their least precipitation at double this 23-year cycle.

Science News Letter, August 29, 1936

NE FIELDS

PUBLIC HEALTH

Bubonic Plague Reported On the West Coast

DETAILS of a mild case of bubonic plague occurring in an eleven-year-old lad living in Monterey County, Calif., have been received by the U. S. Public Health Service from Dr. Harlin L. Wynns of the California State Health Department.

This is the third human case of plague reported in the United States thus far this year, one of the others also occurring in California, while the third was near Beaver, Utah.

Plague has been ever-present in the rodent population in California since an outbreak of human plague occurred in San Francisco early in this century. The disease is transmitted from rats or other rodents to humans by fleas. Plague-infected ground squirrels have been found as far east as Montana and Utah and these animals are a potential source of danger to humans.

Concerned at the spread of plague among the rodents, the U. S. Public Health Service last year doubled its plague-fighting force on the West Coast, assigning two officers to the work instead of one. The California State Health Department also carries on extensive anti-plague operations.

Science News Letter, August 29, 1936

ICHTHYOLOGY

Erosion Silt in Water Provides Hazard for Fish

EROSION not only makes the land unfit for crop production; it also fills the rivers and lakes with silt that makes the water unfit for fish production. Some of the ill effects of erosion silt have been demonstrated by researches of Dr. M. M. Ellis of the U. S. Bureau of Fisheries. He states (*Ecology*, January):

"Erosion silt alters aquatic environments, chiefly by screening out light, by changing heat radiation, by blanketing the stream bottom, and by retaining organic material and other substances which create unfavorable conditions at the bottom."

If light does not penetrate well into the water, it becomes less suitable as a home for fish and other desirable water animals. Silt-filled waters in the central United States reduce daylight to a millionth of its surface intensity at a depth of about a yard, or in especially bad places only half that much. Normal penetration in inland fresh waters ranges from 15 to 35 yards.

Erosion silt also alters the rate of temperature change in river waters, continues Dr. Ellis. This is especially noticeable in lakes through which rivers flow. Here a surface layer of warm, muddy water flows over the deeper, clear, cold water during the summer months. The deeper water, of course, receives little or no sunlight because of the muddy screen above it.

Erosion silt acts murderously on river mussels, often called freshwater clams, which are economically important as the chief source of shell for pearl buttons. Though these animals are usually thought of as mud-dwellers, they actually prefer sand or gravel beds, and cannot stand being silted over. Dr. Ellis states that in water otherwise suitable a layer of silt from one-quarter of an inch to one inch deep produced a high mortality among mussels.

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PALEONTOLOGY

First Record of Dinosaur Found On West Coast

TO A California high school student goes the honor of finding the first evidence that dinosaurs once lived on the West Coast. Western scientists have for years searched for remains of these great prehistoric reptiles, which lived in the Cretaceous period of geological time some 65 million years ago.

The keen-minded high school student was Allan Bennison, who reported his discovery to paleontologists at the University of California. Assistant field directors Curtis J. Hesse and S. P. Welles of the University's Museum of Paleontology have just confirmed the discovery and make their report. (*Science*, Aug. 14).

The discovery, report the University of California scientists, was made in an upper Cretaceous rock formation near Patterson, Calif., and consisted of over 500 bone fragments which seem to have once been the hind quarters of the gigantic, meat-eating reptile, that walked around on its huge hindlegs.

Assembly of the bone fragments is soon to be made in the hope that the exact type of dinosaur can be determined.

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HISTORY

Modern Nations Join to Map Old Roman Empire

COUNTRIES of the world that once formed part of the ancient empire of Rome are now making a survey of that one-time empire.

The French have completed their survey of the frontier in Syria, says a report to *Nature* (July 11). A great part of the survey is necessarily being carried out by airplane, as many sites are in the desert and can only be spotted from the air. Records made by the French include ancient roads, forts, and water supplies. The mapping is on a scale of 1:1,000,000.

Sir Aurel Stein, British archaeologist, has made an offer to authorities concerned to survey that part of the eastern frontier in Transjordania and Iraq.

Science News Letter, August 29, 1936

PUBLIC HEALTH

New Syphilis Program Provides for Training

A FURTHER step in the fight against the Hush-Hush Plague, syphilis, was announced by the U. S. Public Health Service. This is the establishment of a training center for health officers on syphilis control. Details of the arrangement are being sent to all State Health Officers by Surgeon General Thomas Parran.

The Johns Hopkins Medical School and the Johns Hopkins School of Hygiene and Public Health have entered into the arrangement with the U. S. Public Health Service. An elective course in syphilis control will be offered to all students at the School of Hygiene. In addition, the Johns Hopkins University is offering a fellowship for a one or two year term at an annual stipend of $1,800 without maintenance; and from four to six post-graduate students recommended by the Surgeon General will be admitted to the University for special training. These latter, recommended to the Surgeon General by state or local health officers, may be paid the fellowship stipend by the state health officers from Social Security allotments for the training of personnel.

The fight against syphilis has been hampered by the dearth of health officers who have specialized in control of venereal diseases. It is hoped that through this training center a nucleus of well-trained officers will be built up.

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ASTRONOMY

Planets Return

Jupiter and Saturn Shine in Evening; Venus and Mercury May Be Glimpsed at Sunset; Autumn Arrives

By JAMES STOKLEY

DURING the summer months Jupiter has been the only planet visible in the evening, but during September two other of these bodies that, like the earth, revolve around the sun and form the solar system, are coming into view. Jupiter is still visible in the southwest, in the constellation of Ophiuchus, the serpent bearer, and its great brilliance, more than that of any star or other planet in the vicinity, makes it easy to find. Venus is brighter, but is closer to the sun, and only remains visible for about an hour after sunset. However, there should be little difficulty in finding it in the gathering dusk, especially at the end of the month. On September 4 little Mercury, which is rarely seen because it always remains close to the sun's glare, will be in the same region, but greatly inferior in brilliance, so rather difficult to find.

Saturn, however, is easily seen, and its position is shown on the maps. It stands in the direction of the constellation of Aquarius, the water carrier. On September 11 it will be directly opposite the sun, rising at sunset and setting at sunrise, so that it will be visible the entire night. Then it will be closer to the earth than at any other time of the year, only 800,965,000 miles away. It is also at its brightest, with a magnitude of 0.8, inferior to Jupiter or Venus, but as brilliant as most of the stars. It will be slightly brighter than Altair, the brilliant star in Aquila, the eagle, in the southwest.

No Light Of Their Own

The planets have no light of their own, but are made visible by the light of the sun that they reflect to us. The stars, on the other hand, are distant suns, millions of times farther away than our's, and shining by their own glow. Vega, high in the west, is the most brilliant of these that are visible in September evenings. Vega is in the constellation of Lyra, the lyre. Directly overhead is the northern cross, part of Cygnus, the swan. First magnitude Deneb, at the top of the cross, is towards the northeast. These two, with Altair, make a large right triangle in the sky that is a good group to learn.

Another easily recognized group is visible to the east—the great square of Pegasus, the winged horse. The square now seems to rest on one corner. Low in the southeast can be seen a single brilliant star, Fomalhaut, about all that can be found, from the United States, of Piscis Austrinus, the southern fish. The familiar Great Dipper, part of Ursa Major, the great bear, is found to the northwest, and next to it, to the left, is Boötes, supposedly driving the two bears in their constant circuit of the sky. In this is the bright star Arcturus.

Herald of Winter

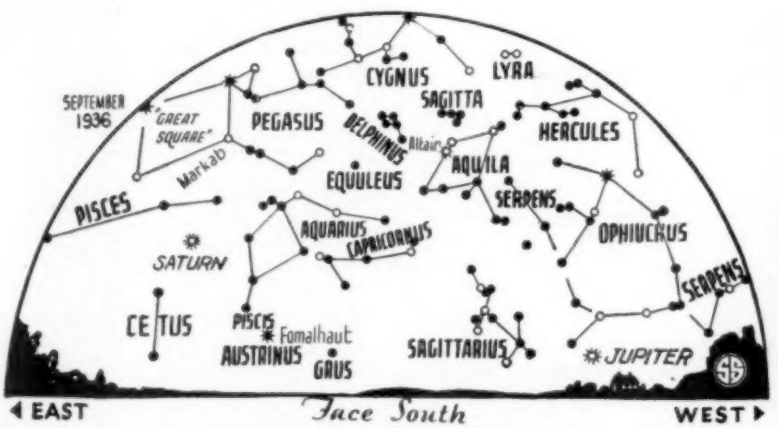
Low in the northeast appears Capella, part of Auriga, the charioteer. This is a group that occupies a prominent position in the evening sky of winter, and its entrance on the celestial stage next month is a herald of the brilliant stars that come into view at the end of the year.

Ever since June 21 the sun has been moving southward in the sky, and this month it reaches the halfway point. On Wednesday, September 23, at 12:26 a.m., eastern standard time, it crosses the celestial equator, which goes through the sky directly over the earth's equator. The passage is called the autumnal equinox, and it marks the beginning of autumn. Supposedly, at this time the day and night are of equal length because then the sun rises directly east, sets directly west, and is above the horizon for just half of the 24 hours.

Visible After Setting

But this is not really the case. As the light of the sun passes through the atmosphere, it is bent downwards, and this has the effect of making any heavenly object, unless it is directly overhead, appear a little higher than it actually is. This effect is greatest for an object close to the horizon, for then its light passes through the greatest length of atmosphere, and the apparent lifting is a little more than the sun's diameter. Consequently, after the sun is entirely below the horizon, its light is bent around the curve of the earth's surface, and we continue to see it for a short time. In the same way, it is seen in the morning before it really has risen.

All this means that on the 23rd the sun will be above the horizon longer than it will be below. At latitude 40 degrees, on this date, the sun begins to appear about 5:47 a.m., local time, and completely hides behind the western horizon at 5:58 p.m. Thus, the day is about ten minutes longer than 12 hours, the night is a corresponding period



SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

SHINING ALL NIGHT

Saturn rises at sunset then rides the sky until dawn. You can easily see it for it is brighter than most of the stars.

BRIGHTEST STAR

This month the honor is held by Vega in the easily found triangle of stars high overhead.

shorter, and the day is 20 minutes longer than the night. Not until the middle of October will the day and night be approximately equal.

At the time of the equinox, nowadays, the sun stands in the direction of the constellation of Virgo, the virgin, a group that we saw in the evening sky of early summer. But many thousands of years ago it stood at this time in the neighboring group of Libra, the scales, and it has been stated by some authorities that this figure was selected for these stars because they symbolized the supposed equality between daylight and darkness at this time of year. In very much the same way, the constellation of Leo, the lion, symbolized the power and glory of the sun, because it stood in that direction when at its highest, at the beginning of summer.

Harvest Moon

From about the 22nd, a day before the moon reaches first quarter, to the end of the month, the evenings will be moonlit. On September 3, at 4:00 a.m., the moon will be in perigee, or nearest the earth, at a distance of 224,700 miles. Its greatest distance of the month, "apogee," the astronomer calls it, will come on the 18th, at 8:00 p.m., when it will be 252,350 miles away. On September 22, the moon, just a day before first quarter and visible as a very full crescent, will pass Jupiter, about two and a half times its own diameter to the south. This will happen at 3:06 a.m., eastern standard time, when neither the moon nor Jupiter will be visible from most of the United States, but on the evening of the 21st the two bodies will be seen close together.

The full moon on September 30, is known as the "harvest moon." On that night, at latitude 40 degrees north, it rises only 32 minutes later than the night before. In contrast, the full moon on March 8, rose nearly an hour later than it did on the 7th. This means that moonlit evenings continue for a longer period after full moon at this time of year, and this is supposed to be of help to the farmers in gathering their harvest. In latitudes farther north, the effect is much greater. At 60 degrees north, for instance, the moon rises only 10 minutes later on the 30th than on the 29th, though on March 8 it rose one hour 18 minutes later than on the 7th.

The moon will be at last quarter on Sept. 7 at 10:14 p.m., eastern standard time, new on Sept. 15 at 12:41 p.m., at first quarter on Sept. 23 at 5:12 p.m., and full on Sept. 30 at 4:01 p.m.

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SEISMOLOGY

4,000 Earthquakes a Year Is Average for Japan

FOUR thousand earthquakes a year! This is the average number of perceptible ones for all Japan. It is small wonder that that country has proved a fruitful laboratory for seismologists.

Recently the Earthquake Research Institute of the Imperial University of Tokyo, Japan, held an exhibition of instruments, apparatus, maps, diagrams, statistics, etc., commemorating the tenth year since the establishment of the Institute and the fifty-fifth year since the organized study of seismology began in Japan.

In 1880, the Seismological Society of Japan was organized by American, English and Japanese scholars in Yokohama and Tokyo for the study of conditions preceding, accompanying, and following earthquakes. One of them, Sir James Alfred Ewing, later a principal of Edinburgh University, invented a horizontal pendulum seismograph in cooperation with Thomas Gray, who added a heavy bob suspended by a spiral spring with which to record vertical motion. The instrument which they worked out has been the model for seismographs ever since.

Dr. Mishio Ishimoto, director of the Institute, is the inventor of a number of instruments to aid in the study of earthquakes, chief among them being the tiltgraph and the accelerograph. With the tiltgraph, which has now been in use for eight years, it has been possible to prove the truth of the proposition of T. Terada, C. Tsuboi, and N. Miyabe, that the crust of the earth (at least in Japan) is composed of blocks. These blocks appear to be several miles in diameter; a general upheaval of the ground is produced by the combined motion of the blocks.

Movement Under Crust

As for the cause of an earthquake, while some scientists hold that it originates from a pair of sliding "faults," or deep crustal cracks, the findings of the Japanese scholars indicate, rather, a movement of the magma, or plastic matter, under the crust of the earth. Mr. Tanahashi of the Kobe Marine Meteorological Observatory, who is interested in the motions which initiate earthquakes, in the pushing waves and the pulling waves, has made a study of the distribution of initial motions; and he finds that a quake may start from several points at the same time, as, for example, in the deep-seated earthquake of June 2, 1931, when the source of motion was quadruple.

Inasmuch as Japan is traversed by six earthquake zones and has in the past 340 years suffered from 27 major earthquakes which took the lives of 161,822 people, it is to be expected that that country should be particularly interested in earthquake prediction. But, although statistics have proved the correlation between quakes and barometric pressure, its gradient, precipitation, tides, etc., these are only the trigger; and as the late Dr. Suyehiro remarked, "An unloaded gun cannot be fired by pulling the trigger." Part of the task ahead is to learn when the gun is loaded, and with what.

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ARCHAEOLOGY

Guatemala Highland Tombs Enclose Rulers, Dog and Slaves

New Discoveries Will Prove "Tremendous Addition To Knowledge of Maya Life, Ceremony, Dress, and Art"

IN the depths of a nest of Mayan pyramids in Guatemala archaeologists of the Carnegie Institution of Washington have discovered important tombs of ancient American rulers. Dr. A. V. Kidder and archaeologists of the expedition who came upon this scene, sealed up for centuries, found the bones fallen and everything in a fragile state almost defying archaeological skill to examine it.

The three tombs explored will yield a wealth of information regarding burial practices of the Mayan Indian empire, America's highest native civilization.

"It will take months to get the collection in shape," Dr. Kidder reports. "But it will prove a tremendous addition to our knowledge of Maya life, ceremony, dress and art."

A fourth tomb is yet to be entered, since the rainy season interrupted the discoveries.

In the center of one tomb a middle-aged priest or ruler had been placed sitting cross-legged. The body was loaded with ornaments—jade beads, beautifully carved jade pendants, ornaments of crystal and shell, and ear plugs. A heap of pottery was beside him.

At his feet a young woman was stationed ready to serve the master in the hereafter. With her were placed the dishes for serving his food, and milling stones for grinding corn. The faithful little dog of the dead ruler stayed with him. The dog's bones were found in one corner of the tomb chamber.

May Solve Mystery

These four tombs may solve the mystery of why the Mayas persisted in building one pyramid over another like a nest of boxes, as if ambitious to make ever larger and loftier foundations for their temples. The location of the four tombs in the four-layered pyramid suggests that when a priest-ruler died he was interred in the pyramid with which he was associated, and which he may have built, as European rulers are sometimes interred in cathedrals. Then the pyramid was sealed by enclosing it within a new one.

The site in Guatemala now being explored by Carnegie Institution expeditions opens up new possibilities in Mayan discovery, because it is in the highlands, rather than in the much-explored lowland jungles of the Mayan area. The pyramid is the first of the kind ever discovered in the highland region, though such construction was common in the lowland Mayan cities.

At the site explored 100 mounds dot an area no longer than a mile and a half, and in these mounds, one of which has already revealed the important tombs, there are hidden ruins of an extensive native community. The site has been called by modern farmers of the region Milaflores, but the archaeologists propose calling it Kaminaljuyu, meaning in the Quiche Indian speech "Hills of the Dead."

Mayan Indians are a challenging mystery to modern science because they achieved a brilliant civilization with no aid from the Old World. Mayan attainments in astronomy, writing, sculpture, architecture and government organization are well known. But, how they arrived at these heights of culture is a puzzle, which archaeologists are determined to trace stage by stage.

Calling the Hills of the Dead a site "of first importance," Carnegie archaeologists have hopes that the solution may be found in these ruins.

Built in Layers

In probing the one mound containing the pyramid and tombs Dr. Kidder has already discovered stratification of buildings. He also has recovered large amounts of pottery from levels of earth which represent a sequence—show what the culture of these people was like at successive eras.

The oldest objects recovered from the Hills of the Dead go all the way back to the Archaic type. That is, they are similar to the oldest relics ever found in other parts of Guatemala and Mexico.

The tombs in the pyramid are not so old as this. Their contents are pronounced closely like objects found at the ruins of Uaxactun, in the lowlands of Guatemala, representing a period of Mayan history known as the Old Empire. This Old Empire flourished, with many cities in Guatemala, Honduras and southern Yucatan, in the earliest centuries of the Christian era.

Dr. Kidder astutely predicted the importance of discoveries in this region over a year ago, when he said:

HILLS OF THE DEAD

This flight of steps leads to number two of a series of four pyramids, superimposed like a nest of boxes, which are being explored in Guatemala by archaeologists of the Carnegie Institution of Washington. The pyramids are tombs for Mayan priests or rulers. This illustration and the one on the facing page are official photographs of the Carnegie Institution.

2101 Constitution Avenue, Washington, D. C.

FOR INCENSE

From the mouth and armpits of the odd figure issued incense when it was used in the rites of ancient Mayas.

"Apparently the highland region was much more of a highway for trade and migration than the densely jungled lowland country. Consequently intensive work on the sites of the region can be expected to provide extremely valuable information as to the chronological interrelation of the various ancient cultures, particularly as it is probable that stratified remains will be discovered." *Science News Letter, August 29, 1936*

MEDICINE

Heart Failure Explained By Deranged Cell Chemistry

STUDY of the chemistry that goes on in the individual muscle cells of the human heart has suggested and supported a fundamental explanation of heart failure.

This important advance in medical knowledge was made in research by Drs. George Herrmann, George Decherd, and associates at the University of Texas School of Medicine, in Galveston.

Heart failure, these investigators reported to the Southern Medical Association and the American Heart Association, is fundamentally a disturbance in the breaking down and rebuilding by the individual heart muscle cells of a chemical called phosphocreatine. This biochemical derangement makes the heart muscle cells less efficient engines of contraction, with the result that the heart fails at its job of pumping blood out through the body.

Inadequate supply of oxygen to the individual heart muscle cells may start these serious chemical changes in the heart muscle cells. In patients with chronic heart disease, anoxemia or deficiency of oxygen content in the blood is the chief causative factor of the pathological chemical changes that weaken and finally exhaust the heart muscle. The administration of oxygen may temporarily postpone these chemical changes.

The chemical basis for contraction of skeletal muscle, previous investigators have found, is a phosphocreatine compound. When this chemical is built up in the muscles from potassium, phosphates and creatine, it becomes a powder barrel of energy, which when touched off is transformed into muscle contraction.

The Texas University investigators have gone into this fundamental problem and have made a study of the chemical makeup of hearts from patients who had died in heart failure. They corroborated the evidence that there is in such hearts a great decrease in creatine, from which it is logical to conclude that during life the phosphocreatine content was abnormally low. Potassium and phosphate were likewise found to be decreased.

The problem was then attacked from the experimental point of view and damage to the heart muscle was produced in various ways and the effects of the damage on the creatine content, as well as the other chemical constituents, was determined. Tying off one of the large arteries which supplies the heart, a condition which experimentally reproduces the effect of coronary thrombosis in human beings, showed conspicuous losses of glycogen, phosphate and creatine in the heart muscle from the area to which the blood supply was cut off.

Heart damage was furthermore produced by injections of combinations of

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substances that have been shown to be followed by visible histological changes. Caffeine and adrenalin were used and the hearts from such animals again showed very striking decreases in the creatine content.

Further studies on the isolated beating heart of the rabbit corroborated the fact that creatine is lost as the isolated heart fails. These hearts, beating outside of the body, nourished by a special solution, showed uniformly low creatine values that were strikingly low when some of the small heart vessels to the heart wall were obstructed. The addition of various amino-acids to the solution was tried in the hope of finding a precursor of creatine that would make up for its loss, or spare what creatine was present in the isolated heart. Alanine alone of all the amino-acids seemed definitely to act as a sparer, while glycine, or glycocoll, which has been used in other human muscle disorders, was next best preserver of creatine. These same amino-acids have been used in patients with heart failure with only slightly encouraging results. The administration of glycocoll has not been found to have done anything more than decrease the sense of bodily weakness in patients with heart failure. Forced oxygenation by mass action accomplished by placing the patient in an atmosphere rich in oxygen has often saved life. Glucose and insulin were of no avail experimentally while they have often seemingly benefited patients in heart failure.

Acidosis, or increased acid in the nourishing solution, a state that results from oxygen deficiency particularly with the overproduction of lactic acid, was shown to increase the loss of creatine from heart muscle cells and thus weaken the organ.

The use of digitalis in the experimental animals seemed to conserve the creatine of the heart. Digitalis, which has long been thought to increase the tone of the failing human heart, now has chemical evidence in favor of its direct action on the heart muscle action.

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ZOOLOGY

Attempt to Save Orang, Python and Dragon-Lizard

TRAVELOGUERS, regaling us with tales of "bringing 'em back alive," have somehow left us with a pretty general impression that the Malayan region is still a brimming reservoir of wildlife, with orang-utans, tigers, water buffalo, and pythons ready to pop out at you at every turn of the jungle trail.

Such, however, seems not to be the case at all. Southeastern Asia, and especially the Netherlands Indies, are giving anxious conservation problems to the European powers charged with administrative responsibility. Desirable laws and their workability, game refuges and their suitability, and most of all field research looking toward more intelligent handling of existing and future problems, are illuminatingly discussed in a bulletin of the Netherlands Commission for International Nature Protection, which has been translated into English as a special publication of the American Committee for International Wild Life Protection.

The tropic East Indian islands that constitute the chief jewels of the Netherlands imperial crown stretch through more than fifty degrees of longitude, just north of the Equator, from Sumatra on the west to New Guinea on the east. Their very names are romantic poetry: Java, Celebes, Ceram, Flores, Timor, the Sundas, the Moluccas—lands that Sindbad knew.

Their fauna is no less provocative to the imagination: orang-utan, gibbon, simiang, tiger, leopard, panther, Malay bear, Sumatra elephant, rhinoceroses with one horn and with two. Here are the famed dragon-lizards of Komodo, the giant pythons, terrible in tales but harmless in fact, the formidable-looking but highly edible iguanas. Here, too, is the narrow Wallace strait, separating Lombok from Bali, famous in evolutionary science long before cameramen and tourists discovered the comeliness of the native women.

Over all this vast faunal realm, like a modern but still anxious Noah, watches the government of the Netherlands Indies. Emulating the example set first when Yellowstone National Park was established by the United States, and brilliantly seconded by such governments as Belgium and Britain in Africa, the careful Dutch have set aside special reserves for orang-utans in Sumatra, and for the almost extinct scaly rhinoceros at the very western tip of Java.

Elsewhere, regulations of hunting and trapping have been promulgated, and repealed on occasion in favor of more practicable ones where it has been found necessary. Research is showing that some animals can get along on less protection than they now have, but that others need more. Some species have already begun to show the effects of scientific intervention on their behalf, but others are still retreating before the onslaughts of hunters, and even more before the felling of the forests by plantation corporations. It is heartening, however, to know that action is being vigorously and actively conducted on this sector of the world-wide battle for the conservation and restoration of wildlife.

Science News Letter, August 29, 1936

RADIO

September 1, 2:15 p.m., E.S.T.

SCIENCE IN HARVARD'S TERCENTENARY—Watson Davis, Director of Science Service.

September 8, 2:15 p.m., E.S.T.

ONE THOUSAND USES FOR WOOD—G. W. Trayer of the U. S. Forest Service.

In the Science Service series of radio programs over the Columbia Broadcasting System.

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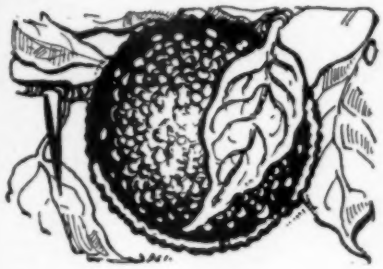
BOTANY

NATURE RAMBLINGS *by Frank Thone*



Breadfruit's Cousin

WE WEAVE glamour around the breadfruit of South Sea Island stories, yet practically ignore a rather close relative that is native to our own land. It is as though we had the second cousin of a maharajah living in our own block, but paid no attention to him because he was born in America and spoke with a Yankee accent.

Or perhaps an Ozarkian accent would hit the analogy a little closer, for our cousin of the breadfruit is the Osage orange, known also as mock orange and simply as "hedge." The Osage orange has its present center of distribution in the corner of the country where Missouri, Arkansas, and Oklahoma come together.

The kinship between Osage orange and breadfruit is easily evident to anyone who has ever seen both, even though not a botanist. The structure is essentially the same: a composite fruit formed of a multitude of narrow, close-fitting wedges, or rather prisms, their tapered ends coming together at a common point in the center, with the tough caps over the outer ends set edge to edge to form a continuous coat.

Here, however, the resemblance ceases. For the fruit of the Osage orange is anything but edible. It is intolerably bitter, and reputed to be poisonous. Even its scent affects some persons unpleasantly. It is distinctly not a plant to be cultivated for its fruit.

Widely cultivated, though, it has been. During pioneer farming days in the Midwest, and to a considerable extent in the East as well, farms were fenced with miles and miles of Osage orange hedge. Its quick growth, rather attractive glossy foliage, stout stems and terrific thorns combined to make it a very good shrub for that purpose.

Then came the invention of barbed wire, and at the same time the rapid rise in Western land prices, so that a farmer could no longer spare from crop production the rather considerable strip of land alongside the hedge, where its shade and the demands of its roots combined to interdict the growth of crops. So out came the miles of Osage hedges, dug up by the men who planted them or by their sons and grandsons.

There were even "hedge-jerking" rigs, with giant plows pulled by steel cables around a steam winch, that contractors took from farm to farm, cleaning up half a mile of hedge in a day. They plowed themselves out of a job eventually, of course, but in the meantime they had pretty well sent the Osage hedge to Limbo. You will still find surviving stretches of old hedge here and there in the country, but nobody ever sets out a new one any more. Osage "fence" definitely belongs to the past.

Science News Letter, August 29, 1936

WILDLIFE PRESERVATION

Balance Wild Duck Losses By New Increases

ALTHOUGH wild ducks have perished by the hundreds in the drought area of the north central plains, the reported duck increase in Canada may offset the loss, says the U. S. Biological Survey.

Science News Letter, August 29, 1936

MEDICINE

X-Rays Show Long Past Injuries of Skull in Adults

SKULL fractures show up just as well in X-ray pictures taken months or sometimes even years after the injury as they do immediately after the accident.

This fact, of great importance in settling legal disputes regarding injuries, is revealed by X-ray pictures taken of 100 patients with fractured skulls over a period of from one to ten years after injury. The investigation was made by two physicians, Drs. Mark Albert Glaser and Edward S. Blaine, Los Angeles.

In children, evidence of the fracture disappears from the X-ray plates sooner than it does in adults. The line of a simple linear fracture in children under 5 years old is likely to disappear completely within six months. In adults, it generally does not begin to fade until 18 months to two years after the fracture. Where the fracture is a crushing in of the skull rather than a linear split, the healing is more rapid and the line of the fracture may not be visible on the X-ray after about one year.

In cases where the bone fragments have been removed or where part of the bone has been taken away in a surgical operation, the bone never fills in or becomes smaller—the only change is a rounding of the edges.

Science News Letter, August 29, 1936

PALEONTOLOGY

Fat Content of "Fossil" Bones Helps Fix Their Age

DETERMINING the fat content of so-called "fossil" bones is one way of fixing the age of archaeological discoveries, according to Dr. Josef Gangl of Vienna, Austria.

It is a lucky chance that the alterations which fatty substances undergo when buried are exceedingly slow—so slow that even for geological periods they may be considered proportional to the total time elapsed, says Dr. Gangl. The accuracy of the method is such as to allow science to fix the age of bones within 100 years when bones are thousands of years old.

This method of age determination, which, of course has been tested with many bones of well-known age, enabled Dr. Gangl to solve a big puzzle of prehistoric science. He could pronounce a decisive verdict in the much-discussed case of the "Bone Awl of Maria Saal," found near Klagenfurt, Austria, in 1924.

The bone owes a world-wide fame to some runic letters incised in it. Nobody was able to decipher these letters. They were thought to be some magic script from the last centuries before our era, and they seemed to prove the southern origin of runic script in general. Therefore the Bone Awl of Maria Saal was treated as a most important finding. It was, however, easy for Dr. Gangl to show that the grease adhering to this bone was obviously recent grease and consequently the bone itself recent.

Science News Letter, August 29, 1936

•First Glances at New Books

Medicine

TRUANTS: THE STORY OF SOME WHO DESERTED MEDICINE YET TRIUMPHED—Lord Moynihan—*Cambridge, Macmillan,* 109 p., $1.40. Based on the Linacre Lecture, in honor of an early physician who distinguished himself in fields other than medicine, this small volume gives brief accounts of many other medical "truants" who won places for themselves in arts, letters, science and statecraft. (See page 133.)

Science News Letter, August 29, 1936

Science and Religion

THROUGH SCIENCE TO GOD—Nathan A. Smyth—*Macmillan,* 213 p., $2.50. The author achieves a sense of oneness with the universe through science, and finds personal satisfaction in this interpretation.

Science News Letter, August 29, 1936

Architecture

THE 1936 BOOK OF SMALL HOUSES—Editors of The Architectural Forum—*Simon and Schuster,* 256 p., $1.96. Anyone who contemplates building a home for a small family at an "above surface" cost of from $1,000 to $20,000 will find the price of this illustrated book well worth while. "Before you buy a lot," architectural styles, the floor plans, specifications, equipment, decoration, financing and landscaping are only a few of the items mentioned. Mainly one sees, however, what other people have done for a given amount of money.

Science News Letter, August 29, 1936

Psychology

GENERAL PSYCHOLOGY—Wayland F. Vaughan—*Doubleday, Doran,* 634 p., $2.50. A textbook for beginners by the professor of psychology at Boston University.

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Criminology

CRIME'S NEMESIS—Luke S. May—*Macmillan,* 244 p., $2. Containing anecdotes concerning the war of the detective and his science against the criminal.

Science News Letter, August 29, 1936

Education

EXPERIMENTAL STUDIES OF THE EDUCATION OF CHILDREN IN A MUSEUM OF SCIENCE—Arthur W. Melton, Nita Goldberg Feldman, Charles W. Mason—*American Association of Museums,* 106 p., $1. What grammar school children actually derive from group visits to museums, and how effective docents are in their lecturing, are questions that have been investigated with enlightening results by these experiments. The report not only analyzes results statistically but also gives some of the exact material used in preparation by the school teachers, lectures of the docents, and information tests that followed museum visits.

Science News Letter, August 29, 1936

Chemistry

PHYSICAL CHEMISTRY—Frank H. MacDougall—*Macmillan,* 721 p., $4. A text placing special emphasis on atomic structure, the laws of thermodynamics and the development of electromotive forces.

Science News Letter, August 29, 1936

Physics

HANDBOOK OF COLORIMETRY—Staff of the M.I.T. Color Measurement Laboratory, under direction of Arthur C. Hardy—*Technology Press,* 87 p., $5. How to measure color in terms of quantities and wavelengths of light.

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Medicine

SYPHILIS AND ITS TREATMENT—William A. Hinton—*Macmillan,* 321 p., $3.50. This clearly and concisely written book aims to give physicians and medical students the chief facts about syphilis, its detection and diagnosis and treatment.

Science News Letter, August 29, 1936

Recreation

ADVENTURES IN RECREATION—Weaver Weddell Pangburn—*A. S. Barnes,* 138 p., 72c. Written in as breezy a style as a book on recreation should be and offering interesting suggestions for the individual as well as for the community.

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Mechanics

ELEMENTARY MECHANISM—Philip K. Slaymaker—*Van Nostrand,* 181 p., $2.25. Fundamental principles and their modern applications worked into a practical textbook.

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Seismology

EARTHQUAKES — Nicholas Hunter Heck—*Princeton Univ. Press,* 222 p., $3.50. A comprehensive survey of earthquakes for lay readers rather than the specialist in the field of seismology, by the government's chief expert in the field. August selection of the Scientific Book Club, the work of Capt. Heck treats the earthquake both as a tool for investigating the interior of the earth and as a menace which man is gradually learning to circumvent.

Science News Letter, August 29, 1936

Zoology

A LABORATORY MANUAL OF CRYPTOBRANCHUS ALLEGHENIENSIS, DAUBIN—Hazel Elisabeth Branch—*Univ. of Wichita,* $1.

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Economic Botany

THE GENERA OF GRASSES OF THE UNITED STATES, WITH SPECIAL REFERENCE TO THE ECONOMIC SPECIES—A. S. Hitchcock—*Govt. Print. Off.,* 302 p., 35c. U. S. Dept. of Agr. Bulletin No. 772. Revision by Agnes Chase of Dr. Hitchcock's work originally published in 1920.

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Mathematics

TEXTBOOK OF TRIGONOMETRY—William H. H. Cowles and James E. Thompson—*Van Nostrand,* 373 p., $2.50. A very complete text of the subject and related branches, leading to higher mathematics, the physical sciences and engineering uses.

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Economics

REGIONAL PLANNING, PART I—PACIFIC NORTHWEST—National Resources Committee—*Govt. Print. Off.,* 192 p., 50c. This first of a series of reports on regional planning in different parts of the United States sets forth the value of the great Columbia River system as a source of raw materials for the United States as a whole, and discusses the best methods of developing the country so that its resources may be conserved.

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